

**What is claimed is:**

1. A system for the graphical synthesis of mechanisms comprising:  
a computer processor capable of processing graphical information and data;  
computer memory, electronically coupled to said computer processor, capable of  
5 storing said graphical information and data;  
a display device electronically coupled to said computer processor, displaying  
graphical information to an operator;  
an operator input interface electronically coupled to said computer processor allowing  
an operator to manipulate said graphical information on said display device; and  
10 a computing application residing in said computer memory and running on said  
computer processor, wherein said computing application receives operator input indicative of  
a desired construct's function from said operator input interface, and processes said operator  
input to extract position and angle data from inputted desired positions of said desired  
construct for use to calculate mechanism solutions having the particular desired function(s)  
15 said mechanism capable of behaving in accordance with said inputted functional  
requirements, said computing application further calculating parameters associated with said  
calculated mechanism for display as graphical information on said display device for said  
operator to view.
- 20 2. The system as recited in claim 1, wherein said computing application comprises a  
computer aided design (CAD) computing application.
3. The system as recited in claim 2, wherein said operator inputted function is  
represented as positions of the mechanism's part(s) by said computing application.
- 25 4. The system as recited in claim 3, wherein said positions comprise beginning, ending  
and/or other positions of the mechanisms' part(s).
5. The system as recited in claim 4, wherein one position is representative of a beginning  
30 point along a desired motion path for said inputted construct.

6. The system as recited in claim 4, wherein one position is representative of a final point along a desired motion path for said inputted construct.

7. The system as recited in claim 4, wherein said mechanism solutions are generated based on inputted desired functions by extracting functional requirements data from said inputted part positions.

8. The system as recited in claim 1, wherein said mechanism solutions include any of: a coupler curve, angle positions, points in space, and/or a mechanisms' motion path.

9. The system as recited in claim 1, further comprising a data store.

10. The system as recited in claim 9, wherein said data store comprises a list of pre-defined constructs, said pre-defined constructs being offered to participating users through said operator interface to facilitate construct design.

11. The system as recited in claim 10, wherein said data store further comprises mechanism components, said mechanism components utilized when synthesizing mechanisms for inputted constructs.

12. The system as recited in claim 11, wherein said mechanism components comprise any of linkage points, links, link assemblies, mechanism bars, and mechanisms.

13. The system recited in claim 1, wherein said computing application operates in a computer network environment, said computer network environment comprising any of: a fixed-wire LAN, a wireless LAN, a fixed-wire WAN, a wireless WAN, a fixed-wire intranet, a wireless intranet, a fixed-wire extranet, a wireless extranet, the Internet, and the wireless Internet.

14. A method for calculating and generating computerized graphical representations of mechanism solutions on a computing system having, memory, an input interface, and a

display device, comprising the acts of:

receiving information indicative of a construct's desired function and intended positions for said

construct by said computing system;

5 processing said inputted information on said computing system to produce a mechanism viewable to the operator; and

displaying said mechanism solutions based on the inputted desired function operating on said inputted construct on said display device.

10 15. The method as recited in claim 14, wherein said inputting step comprises the step of receiving data points from said input interface, said data points representative of said desired construct and desired construct positions.

15 16. The method as recited in claim 14, wherein said processing step comprises the steps of:  
extracting position data from said received intended positions, said position data being represented by vectors comprising any of position and angle information; and  
calculating an appropriate mechanism using said position data.

20 17. The method as recited in claim 16, wherein said calculating step comprises the step of providing mechanisms having behavior parameters that accommodate said construct having said construct positions, said mechanism behavior parameters comprising at least one of a group comprising: mechanism's motion path, mechanism's coupler curve, and associated mechanism elements

25 18. The method as recited in claim 14 further comprising the step of storing said synthesized mechanism and said inputted function in said memory.

30 19. A computer readable storage medium comprising computer-executable instructions for instructing a computer to perform the acts recited in claim 14.

20. A method to synthesize mechanisms having desired behavior comprising the acts of:  
providing construct dimensional information and construct positional parameter  
information, said positional parameters indicative of said constructs' desired positions along a  
desired motion path; and

5 processing said positional parameters to suggest mechanisms that are operable on said  
constructs.

21. The method as recited in claim 20, wherein said providing act comprises the act of  
receiving positional data from participating users through a graphics computing application,  
10 said positional data representative of desired positions for said constructs.

22. The method as recited in claim 20, wherein said processing act comprises the acts of  
extracting and calculating the vector values from said positional parameters and from said  
construct dimensional information, said vector values used to calculate mechanisms operable  
15 on said constructs.

23. The method as recited in claim 22, wherein said vector values comprise a position  
value and an angle value.

20 24. A system to synthesize mechanisms for constructs to move along desired motion paths  
comprising:

an input means, said input means comprising an interface to receive data;

a processing means, said processing means cooperating with said input means to  
extract relevant position data from said received data for use when synthesizing mechanisms;

25 and

a display means, said display cooperating with said processing means display output  
representative of said synthesized mechanisms.

25. A system for designing, synthesizing, and analyzing mechanisms comprising:

30 an interface system, said interface system capable of receiving data representative of  
two and three dimensional constructs for modeling in a computing modeling environment;

an data extractor system, said data extractor system capable of extracting relevant data from said received data representative of said constructs; and

a solver system, said solver system cooperating with said data extractor system to provide mechanism solutions; and

5 a display system, said display system capable of displaying said mechanism solutions in conjunction with said inputted constructs, wherein said mechanisms and said constructs are amenable to animation in a modeling space of a computing modeling environment.

26. A method for designing, synthesizing, and analyzing mechanisms comprising the steps of:

10 receiving data representative of constructs by a computing modeling environment, said construct data indicative of desired functional requirements;

extracting relevant data from said received construct data;

15 providing mechanism solutions to satisfy said functional requirements, said solutions calculated using said extracted data; and

displaying said mechanism solutions and said constructs such that said mechanisms solutions are operable on said constructs.